Title	Studies on secondary metabolites produced by Ceriporiopsis subvermispora
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Citation	Sustainable humanosphere : bulletin of Research Institute for Sustainable Humanosphere Kyoto University (2009), 5: 35-35
Issue Date	2009-09-10
URL	http://hdl.handle.net/2433/182155
Right	
Type	Departmental Bulletin Paper
Textversion	publisher

Studies on secondary metabolites produced by *Ceriporiopsis subvermispora*

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Exposure of cell wall polysaccharides by removal lignin is an initial key step for enzymatic and microbial conversion of woody biomass. A white rot fungus, *Ceriporiopsis subvermispora* is able to degrade lignin without intensive damage of cellulose at a site far from enzymes. Extracellular metabolites play a central role to control the selective ligninolysis. The unique wood decay system has been receiving a great deal of attention because the biological or biomimetic ligninolytic systems can be applied to the conversion of woody biomass into fuels, chemicals and pulps. We are interested in the key extracellular metabolites of *C. subvermispora,* and found that the fungus produced a series of novel itaconic acid derivatives with a long alk(en)yl side chain at position C-3 of their core (ceriporic acids). So far, ceriporic acid A, B, C and D were isolated and identified in comparison with authentic compounds[1-5]. Ceriporic acid B (1-nonadecene-2,3-dicarboxylic acid) inhibited generation of cellulolytic hydroxyl radicals by the Fenton reaction system[6], leading to suppression of cellulose degradation. At an incipient stage of wood decay, this fungus produced manganese peroxidase (MnP) and fatty acids to initiate extracellular lipid peroxidation[1]. During wood decay, a glucan matrix called sheath is produced by the fungus[7], and the matrix controls transport of metabolites and uptake of lignin and polysaccharide fragments.

In the present thesis, the author profiled metabolites involved in the fungal sheath under ligninolytic conditions. To analyze the metabolites in the sheath under ligninolytic conditions, a new cultivation system was developed. By the analysis of secondary metabolites in the sheath, new analogues of ceriporic acids have been found.

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